

Descriptions of the Larvae of *Ceratognathus niger* (Westw.)

Coleoptera: Lucanidae (Stag Beetle)

by

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Descriptions of the larvae of several species of Lucanidae *Lamprima varians* Germer., *Lissapterus howittanus* Westw., *Lissotes furcicornis* Westw. and *Syndesus cornutus* Fab. were given recently (Alderson 1975). As a continuation of the work, descriptions of the larvae of *Ceratognathus niger* Westw. and the differences found in the characters of these five species discussed in this paper.

The beetle *Ceratognathus niger* (Plate I) is one of the smaller species of Australian stag beetles and in Victoria this species breeds mainly in the rotting wood of Acacias, but occasionally inhabits the decaying outer layers of Eucalypt logs. Mature larvae have been observed to pupate either during spring months (Sept.-Nov.), with adults emerging in summer, or during late summer-early autumn (Feb.-April), with adults remaining in galleries during winter-spring, before emerging the following summer. The species is nocturnal and on warm summer evenings can be seen flying on the foothills of open sclerophyll forest in the south-eastern region of the State.

General appearance of mature larvae of *Ceratognathus niger* (Plate II).

Body white in colour, elongate, slightly tapering posteriorly, varying in length from 18 to 25 mm on the dorsal aspect. Head yellow in colour, with ocelli at the side of antennae. Abdominal spiracles and pre-spiracular

sclerites are lightly pigmented; pale yellow. Abdominal spiracles become smaller posteriorly; 8th abdominal spiracle ill-defined. Anal segment with longitudinal anal opening.

EPIPHARYNX (Plate II, Fig. 2).

Anterior portion of lateral margin angulate. Mesal anterior projection extending to middle of spinose annulus and the fused keeled torma are lightly pigmented; pale yellow. Spines on spinose annulus thicker and somewhat truncated on right side. Keel on pternotorma longer. Distal sensory area with a patch of 8-9 very short, fine, truncated spines each situated in middle of sense spot. Proximad of these and immediately anterior to the spinose annulus occurs a curved transverse row of 6-10 pointed spines. Three stout, pointed setae are situated on the paria near lateral margin. Proximal sensory area comprises one long medial sense cone with three fine, pointed setae on right side; two shorter setae on left side (without paltes).

ANTENNAE (Plate II, Fig. 3).

First and second segment devoid of setae; terminal segment similar to *Syndesus cornutus*.

TARSUNGULUS (Plate II, Figs. 4-5).

Legs terminate with an elongate tubercle, tapering to a slightly curved, medial, spine-like claw. One small spine occurs on inner side near base

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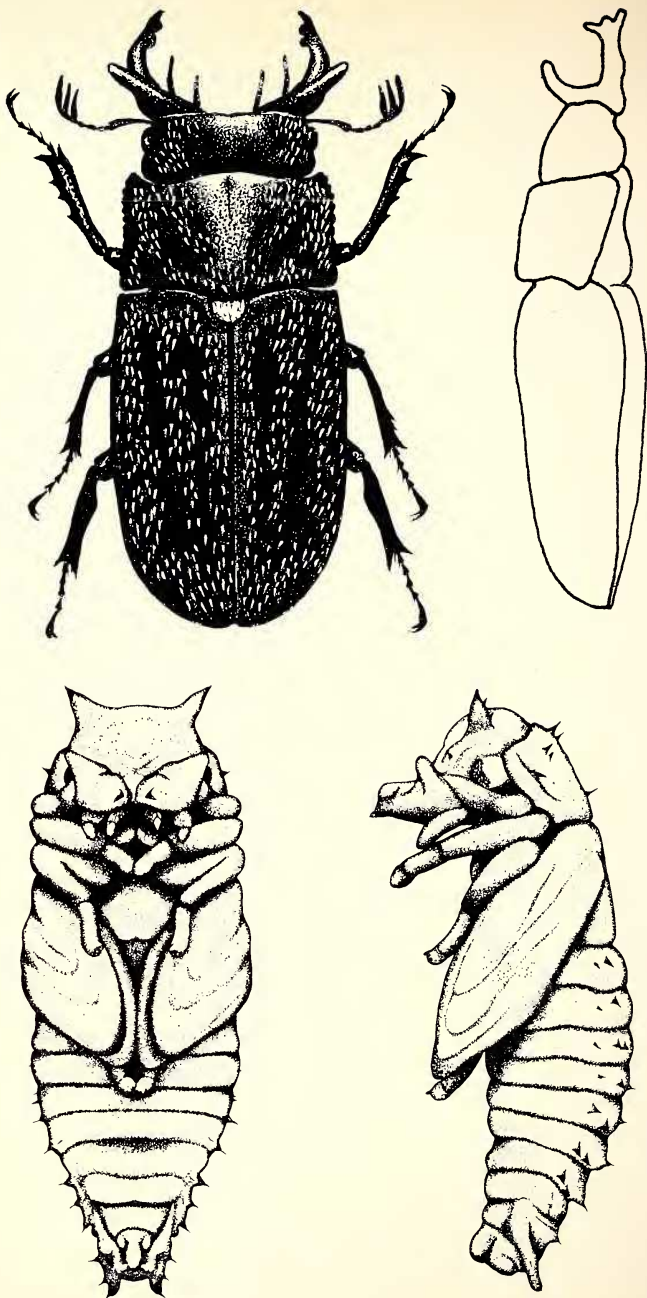
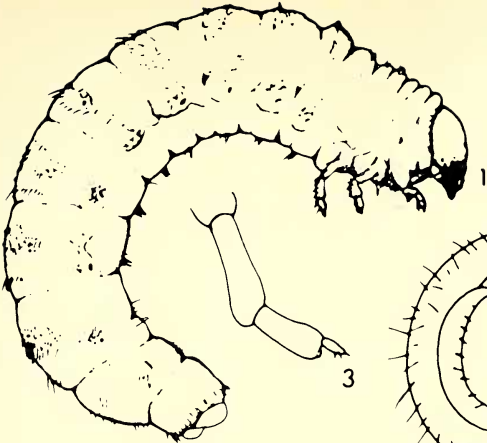


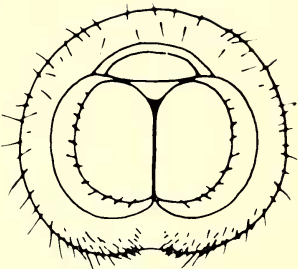
Plate I.

Ceratognathus niger (Westw.) adult male (length 12 mm), and pupa.

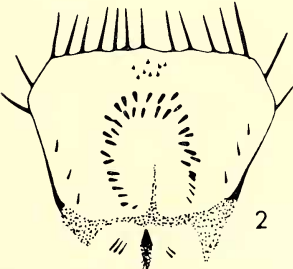
Plate II.



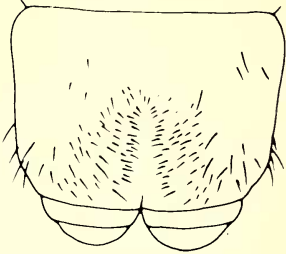
1. Larva of *Ceratognathus niger* (Westw.).



2. Epipharynx (underside of labrum).

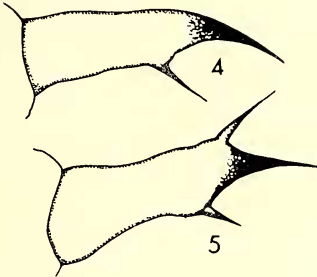


3. Antennae.

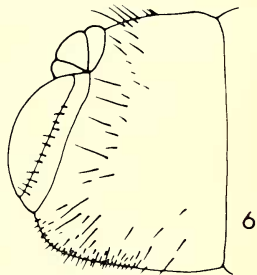


4. Tarsungulus (lateral).

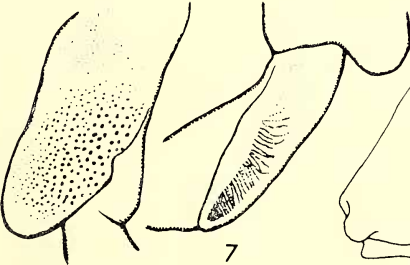
5. Tarsungulus (dorsal).



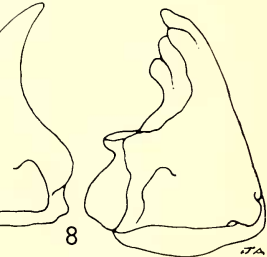
6. Anal segment (caudal, ventral, lateral views).



7. Stridulatory organs of mesothoracic and meta-thoracic legs.



8. Mandibles (ventral).



of medial claw; directed forward. Another small spine occurs ventrally, slightly behind inner spine; directed antero-ventrally.

ANAL SEGMENT (Plate, Fig. 6).

Anal segment tri-lobed, with dorsal anal lobe inflated and having distinct inflated pad; devoid of setae. Anal lobes and pads ovate, with several small setae forming a fringe along inner lateral margin of each lobe. Short, strong, introrse setae occur on each side of narrow, closed septula which extends about half the length of the segment (similar to *Syndesus cornutus*).

Mandibles and the stridulating organs are shown in Figures 7-8.

Discussion

In the initial stages of this study difficulties were encountered in distinguishing differences between larvae of Scarabaeidae because the existing key describing the Lucanidae larvae of Australia lacks description of specific key structures. To overcome this problem, the author bred-out several larvae to the adult stage to establish their identity. Although the results of this project are not intended for key construction, the consistent and inconsistent structural characteristics found in the five species (representing five genera) are briefly discussed.

EPIPHARYNGES

The structures of the epipharynges, such as the sense organs of the proximal sensory area; fused torma, spinose annulus and the anterior projection into the annulus, were generally consistent in form. The fused torma on most specimens of *Lissapterus howittanus* exhibit early (?) development of an apotorma each side of the anterior projection and on one specimen extended for about one-third the length of its anterior projection. It should also be noted that a second sensory projection is situated near the middle

on the basal margin of the fused torma. This appears as a small, black extension behind the anterior projection and occurs on all species except *Ceratognathus niger*. The projection is rather small and difficult to locate unless the lighting is carefully directed. Characters of the distal sensory area (spines and spots) were consistent in form and position in *Lamprima varians* and *Syndesus cornutus*, but inconsistent in *Lissapterus howittanus* and *Lissotes furcicornis*. The spinose sensory spots on the distal sensory area of *Lissapterus howittanus* were often irregularly placed and lacked the spines; these are apparently broken off at an early stage soon after ecdysis. Sense spots anterior to the transverse row of four spots on *Lissotes furcicornis* are often irregularly placed. The sense organs on the distal sensory of both these species could be described as a longitudinal patch. The curved transverse row of spines anterior to the spinose annulus on *Ceratognathus niger* larvae do not always merge into the annulus, but often occur as a distinct, separate, shorter row. *Ceratognathus niger* larvae were the only ones having setae (not plates) on each side of the medial sense cone; these setae appear to be an important character in separating this genus from others.

Dr. B. P. Moore (pers. comm.) observed that tarsunguli on the larvae of *Lamprima aurata* are clawless. This is supported by the results of the earlier study (Alderson 1975) on *Lamprima varians* and unpublished observation (Alderson) on *L. latereillei*; both these species are clawless. Tarsunguli may well be a major character separating the genera, for the larvae of another species of *Lissotes* [*Lissotes darlingtoni* (unpublished observation)] had curved claws very similar to *Lissotes furcicornis*. The tarsunguli of *Lissapterus howittanus*, *Syndesus cor-*

nutus and *Ceratognathus niger* were also different in form from each other but consistent in form within each species.

ANAL SEGMENTS

Larvae of *Lamprima varians* and *L. latreillei* exhibit anal pads which together are cordate when viewed from the caudal aspect and subsequently are distinctly different in form from all other species examined. The V-shaped upper half of the septula extending into the campus on *Lissotes furcicornis* is not always consistent in form. Some specimens often exhibit a few scattered setae which merge toward the middle line on the right side. The anal pads of *Lisspaterus howittianus* are more reniform (concave on inner margin) when anal lobe inflation is extensive. The position (angle) of the setae forming the septula and those setae situated on the

ventral portion of the anal lobes were found to be consistent in all species.

Acknowledgements

This study could not have commenced without the generous assistance of Lorraine Alderson, Susan Beattie, Bill and Chris Robbins and Fabian Douglas. I am grateful to Dr. B. P. Moore (C.S.I.R.O.) for disclosing the importance of the "anal segment and tarsungulus" and wish to thank members of the Fisheries Divisions staff, Drs. D. Evans and Z. Abedi, Messrs. J. Cooper, J. Bacher, K. Beinssen, J. Seebeck, P. Rogan and R. Warnecke for their assistance in many ways.

REFERENCE

Alderson, J., 1975. Descriptions of the Larvae of Four species of Lucanidae. *Victorian Nat.*, Vol. 92, No. 4: 71-29, pl. I-V.

NEW SECRETARY NEEDED

Unfortunately Mr. Garnet Johnson, who was keen to do all he could as Honorary Secretary when he took over the job earlier this year, now finds that owing to circumstances beyond his control, he will be unable to attend meetings and regretfully has tendered his resignation as Hon. Secretary at the end of October. This means the Club wants some member who has the welfare of the Club at heart, male or female, to step into the breach and help carry the Club along. Can you assist in any way to share the work of secretary?

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As this award is, in the future, to be financed from the Trust Fund, now is the time for all donations to be sent in to ensure its worthwhile continuance.

GARNET JOHNSON,
Hon. General Secretary.